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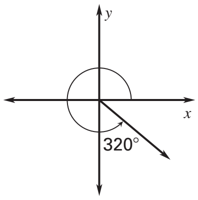

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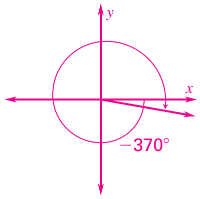

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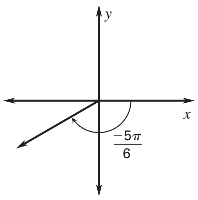

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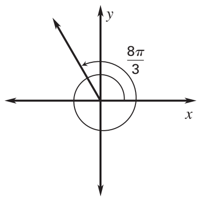

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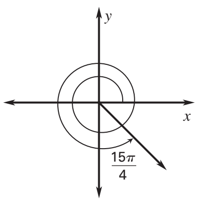

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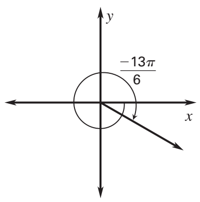


34.

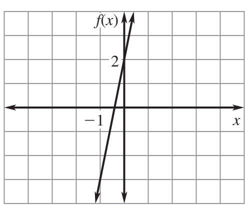
$$\begin{aligned} e^{a+bi} &= e^a(\cos b + i\sin b) \\ \ln(e^{a+bi}) &= \ln[e^a(\cos b + i\sin b)] \\ (a+bi)\ln e &= a\ln e + \ln(\cos b + i\sin b) \\ (a+bi)(1) &= a(1) + \ln(\cos b + i\sin b) \\ a + bi &= a + \ln(\cos b + i\sin b) \\ bi &= \ln(\cos b + i\sin b) \\ e^{bi} &= e^{\ln(\cos b + i\sin b)} \\ e^{bi} &= \cos b + i\sin b \end{aligned}$$

Letting $b = \pi$:

$$\begin{aligned} e^{\pi i} &= \cos\pi + i\sin\pi \\ e^{\pi i} &= -1 + i(0) \\ e^{\pi i} &= -1 \\ e^{\pi i} + 1 &= 0 \end{aligned}$$

13.3 Mixed Review (p. 872)

41.



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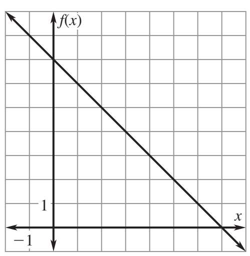

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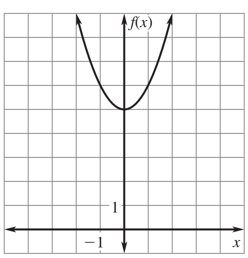

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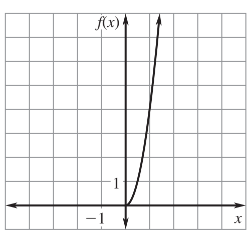

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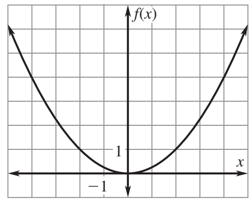

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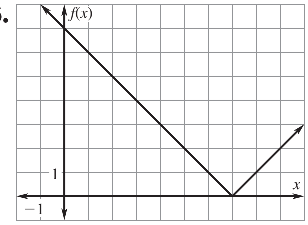


13.4 Investigating Algebra Activity (p. 874)

Step 1.

θ	$-\pi$	$-\frac{3\pi}{4}$	$-\frac{\pi}{2}$	$-\frac{\pi}{4}$	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π
$f(\theta) = \sin\theta$	0	$-\frac{\sqrt{2}}{2}$	−1	$-\frac{\sqrt{2}}{2}$	0	$\frac{\sqrt{2}}{2}$	1	$\frac{\sqrt{2}}{2}$	0
$g(\theta) = \cos\theta$	−1	$-\frac{\sqrt{2}}{2}$	0	$\frac{\sqrt{2}}{2}$	1	$\frac{\sqrt{2}}{2}$	0	$-\frac{\sqrt{2}}{2}$	−1

Step 2. $-\frac{\sqrt{2}}{2}$ appears more than once for different values of θ. **Step 3.** No; $\frac{\sqrt{2}}{2}$ appears more than once for different values of θ.

Quiz for Lessons 13.3–13.4 (p. 880)

1. $\sin\theta = -\frac{\sqrt{10}}{10}$, $\cos\theta = \frac{3\sqrt{10}}{10}$, $\tan\theta = -\frac{1}{3}$, $\csc\theta = -\sqrt{10}$, $\sec\theta = \frac{\sqrt{10}}{3}$, $\cot\theta = -3$ **2.** $\sin\theta = \frac{5\sqrt{74}}{74}$, $\cos\theta = -\frac{7\sqrt{74}}{74}$, $\tan\theta = -\frac{5}{7}$, $\csc\theta = \frac{\sqrt{74}}{5}$, $\sec\theta = -\frac{\sqrt{74}}{7}$, $\cot\theta = -\frac{7}{5}$ **3.** $\sin\theta = \frac{2\sqrt{5}}{5}$, $\cos\theta = \frac{\sqrt{5}}{5}$, $\tan\theta = 2$, $\csc\theta = \frac{\sqrt{5}}{2}$, $\sec\theta = \sqrt{5}$, $\cot\theta = \frac{1}{2}$ **4.** $\sin\theta = -\frac{\sqrt{17}}{17}$, $\cos\theta = -\frac{4\sqrt{17}}{17}$, $\tan\theta = \frac{1}{4}$, $\csc\theta = -\sqrt{17}$, $\sec\theta = -\frac{\sqrt{17}}{4}$, $\cot\theta = 4$

13.5 Problem Solving (pp. 887–888)

47. b. *Sample answer:* Method 1: use the Pythagorean Theorem to find the third side of the triangle (451 m). Now construct a triangle from the top of the cliff to the top of the building and the observer. The angle at the observer is 9° and the angle at the base of the building is 153°. Use the law of sines to find the height of the building. Method 2: Construct a right triangle with the height of the building and the cliff being a leg which measures $300 + x$, the distance from the observer to the base of the cliff being 152.9 meters, and the measure of the angle from the observer to the top of the building is 72°. Now use the sine relationship to solve for x; about 170 m.

13.6 Skill Practice (pp. 892–893) **42.** *Sample answer:* Place $\triangle ABC$ on a coordinate system such that $\overline{AC}$ is on the x-axis with A having coordinates (0, 0), B having coordinates (x, h), and C having coordinates $(b, 0)$. Start by finding the coordinates of B in terms of trigonometric values. Do this by solving the right triangle: $\sin A = \frac{h}{c} \to h = c \sin A$ and $\cos A = \frac{x}{c} \to x = c \cos A$. Now use the distance formula to find the length of a: $a^2 = (x - b)^2 + (h - 0)^2$. Substitute the trigonometric ratios for x and h to get $a^2 = (c \cos A - b)^2 + (c \sin A)^2$. Next simplify the right side by evaluating each set of parentheses. Simplifying gives

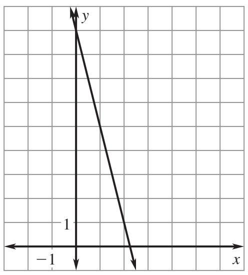
$a^2 = c^2 \cos^2 A - 2bc \cos A + b^2 + c^2 \sin^2 A$
$a^2 = c^2 (\cos^2 A + \sin^2 A) - 2bc \cos A + b^2$
$a^2 = b^2 + c^2 (1) - 2bc \cos A$
$a^2 = b^2 + c^2 - 2bc \cos A$

This gives you one formula for the law of cosines. The other two versions can be derived in a similar fashion. If you evaluate the law of cosines with a right triangle, the side opposite the 90° angle would reduce the law of cosines to

$a^2 = b^2 + c^2 - 2bc \cos 90$
$a^2 = b^2 + c^2 - 2bc(0)$
$a^2 = b^2 + c^2$

which is the Pythagorean theorem.

13.6 Mixed Review (p. 894)

49.


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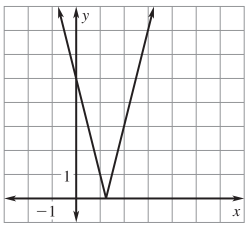

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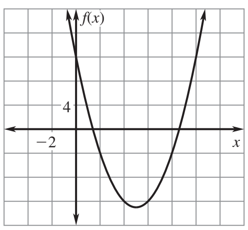

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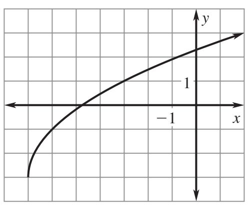

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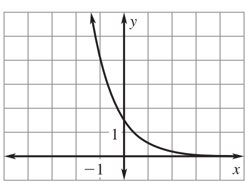

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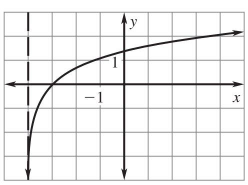
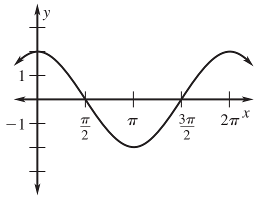


Chapter 14

14.1 Guided Practice (pp. 909–912)

1.


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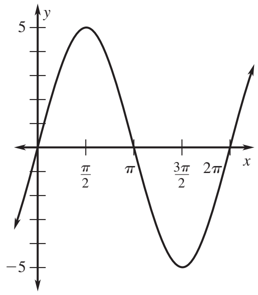

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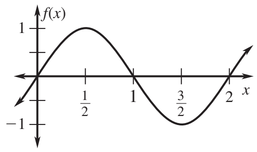

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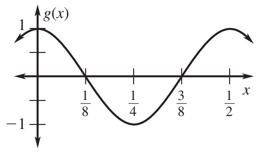
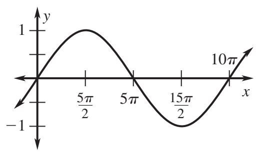


14.1 Skill Practice (pp. 912–913)

6.


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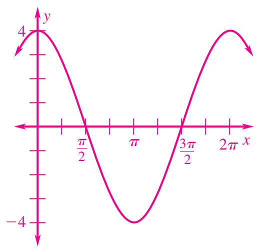

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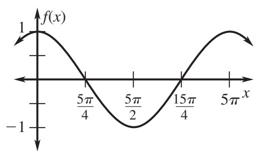

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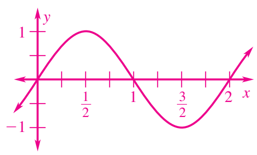

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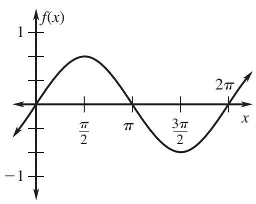

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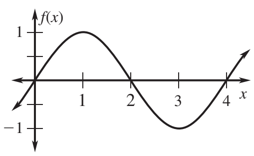

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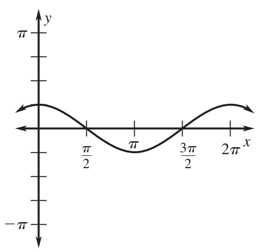

13.